INFORMATION SHEET

ORDER NO. R5-2008-
BP WEST COAST PRODUCTS
ARCO/BP STOCKTON TERMINAL #40T
ENHANCED BIOREMEDIATION PILOT STUDY
SAN JOAQUIN COUNTY

BP West Coast Products (Discharger) owns the bulk fuel terminal at 2700 Washington Street in Stockton (site). The Discharger is a member of the Stockton Terminals Technical Committee, which was formed with three other bulk fuel terminal companies on the same assessor's parcel to address site wide groundwater pollution. A majority of the mass of petroleum pollution is in the A water bearing zone which is about 5 to 20 feet below ground surface.

This proposed pilot study is a follow-up to a 2004 pilot study in which sulfate, nitrate, and ammonium phosphate solution was injected into the A zone through three wells. During the 2004 study, the Discharger observed increases in sulfide, ammonium as nitrogen, and orthophosphate above baseline levels. These exceedances were addressed by adjusting baseline concentrations, conducting confirmation sampling, and correcting the laboratory analytical method, respectively. The Discharger concluded that the effects of the injections were limited to a small area around the injection wells. The study was completed in 2005.

For this study, the Discharger proposes weekly slug injections of potassium nitrate, potassium sulfate, and potassium phosphate dibasic substrates into seven wells in the A water bearing zone for three months to enhance anaerobic biodegradation. Potassium will replace sodium as the counter ion in the nitrate/sulfate/phosphate solution in order to avoid an accumulation of residual sodium. A potassium bromide tracer will be used to assess the rate of transport. Two hundred and forty gallons of the solution will be injected into each of the seven wells at a rate of about 0.074 gpm during each of the 14 weekly injections for a total dose of 23,520 gallons for the pilot study. Groundwater samples from 17 downgradient wells and one upgradient well will be collected weekly during the first month, monthly for the first six months and quarterly thereafter to evaluate the effectiveness of the injections.

If the levels of nitrate and sulfate in AR/MW-23A drop below baseline levels and upon written approval of the Executive Officer, the Discharger may begin a second three-month cycle of the injection with a 280 mg/L concentration of the potassium nitrate/sulfate/phosphate solution. If concentrations of nitrate, sulfate, nitrogen, sodium, ammonium, sulfide, phosphate or phosphorous are detected at 20 percent or more above baseline levels at the downgradient compliance well AR/MW-1A, the Discharger will cease the injection and conduct monthly monitoring for three months. If the exceedence is confirmed at the end of the three month monitoring period, the Discharger will implement a contingency plan and install a groundwater extraction and treatment system. The contingency plan also will be implemented if the nutrient concentrations stabilize above water quality objectives within the test area after four quarters of monitoring.